

CLAIMS

1. A communication device, comprising:

transmission means for transmitting a plurality of data segments to a destination device via a packet communication network, each of the plurality of data segments including a sequence number, the plurality of data segments being transmitted in sequence number order;

receiving means for receiving an acknowledgement indicating a data segment to be received next;

retransmission means for changing a transmission rate, and for retransmitting one of the plurality of data segments in a case that the communication device has not received an acknowledgement including an acknowledgement number greater than a sequence number included in the one of the plurality of data segments when a predetermined time elapses following transmission of the one of the plurality of data segments by the transmission means;

control means for determining a subsequent data segment to be transmitted next, and for controlling a transmission rate on the basis of a category of the acknowledgement and information included in the acknowledgement, to transmit the subsequent data segment.

2. A communication device according to Claim 1, wherein:

the retransmission means retransmits again, after the one of the plurality of data segments has been retransmitted, the one of the plurality of data segments when the receiving means receives a predetermined number of acknowledgements, all of which include the same acknowledgement number; and

the control means updates the transmission rate on the basis of a transmission rate at a point in time immediately before the predetermined time elapses, in a case that the receiving means receives an acknowledgement including an acknowledgement number subsequent to a maximum sequence number included in data segments which have already been transmitted.

3. A communication device according to Claim 1, wherein:

the retransmission means retransmits again the one of the plurality of data segments when the receiving means receives a predetermined number of selective acknowledgements, all of which include the same acknowledgement number after the one of the plurality of data segments has been retransmitted, the selective acknowledgement further including selective acknowledgment information for identifying received data segments, the one of the plurality of data segments being identified by the selective acknowledgment information; and

the control means updates the transmission rate on the basis of a transmission rate at a point in time immediately before the predetermined time elapses, in a case that the receiving means receives an acknowledgement including an acknowledgement number subsequent to a maximum sequence number included in data segments which have already been transmitted.

4. A communication device according to Claim 1, wherein:

the control means updates the transmission rate on the basis of a transmission rate at a point in time immediately before the predetermined time elapses, in a case that the receiving means receives an acknowledgement including an acknowledgement number equal to a sequence number which is a predetermined number greater than a sequence number included in the one of the plurality of data segments retransmitted by the retransmission means.

5. A communication device according to Claim 1, wherein:

the retransmission means retransmits again the one of the plurality of data segments, in a case that the receiving means receives an acknowledgement including an acknowledgement number greater than a sequence number which is a predetermined number greater than a sequence number included in the one of the plurality of data segments retransmitted by the retransmission means; and

the control means updates the transmission rate to be less than a transmission rate at a point in time immediately before the predetermined time elapses, in a case that the receiving means receives an acknowledgement including an acknowledgement number subsequent to a maximum sequence number included in data segments which have already been transmitted.

6. A communication device according to Claim 1, wherein:

the control means updates the transmission rate to be less than a transmission rate at a point in time immediately before the predetermined time elapses, in a case that the receiving means receives an acknowledgement including an acknowledgement number equal to a sequence number which is a predetermined number greater than a sequence number included in the one of the plurality of data segments retransmitted by the retransmission means.

7. A transmission control method, comprising the steps of:

transmitting a plurality of data segments to a destination device via packet communication network, each of the plurality of data segments including a sequence number, the plurality of data segments being transmitted in sequence number order;

receiving an acknowledgement indicating a data segment to be received next;

changing a transmission rate, and retransmitting one of the plurality of data segments in a case that the communication device has not received an acknowledgement including an acknowledgement number greater than a sequence number included in the one of the plurality of data segments when a predetermined time has elapsed following transmission of the one of the plurality of data segments in the transmitting step;

determining a subsequent data segment to be transmitted next; and controlling the transmission rate on the basis of a category of the acknowledgement and information included in the acknowledgement, to transmit the subsequent data segment.

8. A program product for causing a computer to execute:

a process of transmitting a plurality of data segments to a destination device via a packet communication network, each of the plurality of data segments including a sequence number, the plurality of data segments being transmitted in sequence number order;

a process of receiving an acknowledgement indicating a data segment to be received next;

a process of changing a transmission rate and of retransmitting one of the plurality of data segments in a case that the communication device has not received an acknowledgement including an acknowledgement number being greater than a sequence number included in the one of the plurality of data segments when a predetermined time elapses following transmission of the one of the plurality of data segments in the transmitting step;

a process of determining a subsequent data segment to be transmitted next, and for controlling the transmission rate on the basis of a category of the acknowledgement and information included in the acknowledgement, to transmit the subsequent data segment.